Prevalence and Intensity of Sea Lice (*Lepeophtheirus salmonis*) Infection on Juvenile Pink Salmon (*Oncorhynchus gorbuscha*) in the Bering Sea – September 2002

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PREVALENCE AND INTENSITY OF SEA LICE (*Lepeoptheirus salmonis*) INFECTION ON JUVENILE PINK SALMON (*Oncorhynchus gorbuscha*) IN THE BERING SEA – SEPTEMBER 2002

by

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In this report, we present data on the prevalence and intensity of sea lice (*Lepeophtheirus salmonis*) infection on pink salmon (*Oncorhynchus gorbuscha*) caught in the Eastern Bering Sea. Approximately 25% of the 284 juvenile pink salmon examined were infected with 1-6 sea lice, with a mean intensity of 1.5 sea lice per infected fish. The abundance of sea lice averaged 0.36 per fish. Although sea lice counts were probably underestimated in this study due to scale loss, the data collected in this study provide an initial reference for comparing other studies that use the same fishing gear, and to establish background levels of sea lice infection on juvenile pink.

RÉSUMÉ

Trudel, M., E.V. Farley, Jr., B.L. Wing, and D.W. Welch. 2002. Prevalence and intensity of sea lice (*Lepeophtheirus salmonis*) infection on juvenile pink salmon (*Oncorhynchus gorbuscha*) in the Bering Sea – September 2002. Can. Data Rep. Fish. Aquat. Sci. 1107: 19 p.

Dans ce rapport, nous présentons des données sur la prévalence et l'intensité des infections aux poux marins (*Lepeophtheirus salmonis*) sur les saumons roses (*Oncorhynchus gorbuscha*) capturés dans la mer de Béring Est. Environ 25% des 284 saumons roses juvéniles que nous avons examinés étaient infectés par 1-6 poux marins. L'intensité moyenne d'infection était de 1.5 poux marins par poisson infecté. L'abondance moyenne était de 0.36 pou marin par poisson. Bien que le nombre de poux marins a probablement été sous estimé au cours de cette étude, les données recueillies dans cette étude pourront servir de référence initiale pour comparer d'autres études qui utilisent le même type d'engin de pêche, et pour établir les niveaux d'infection de base des poux marins chez les saumons roses juvéniles.

INTRODUCTION

Sea lice (Copepoda: Caligidae) are frequently encountered on wild and farmed salmon (Margolis 1958; Kabata 1979; MacKinnon 1997). Severe outbreaks of sea lice infection are particularly common in farmed salmon in Europe and Eastern Canada, probably because the crowding conditions in aquaculture are favorable for the transmission of this parasite (Wootten et al. 1982; Hogans 1995; MacKinnon 1997). As sea lice infection on wild Atlantic salmon (*Salmo salar*), Arctic char (*Salvelinus alpinus*), and sea trout (*Salmo trutta*) have increased in areas of intense salmon farming in Norway (Bjørn et al. 2001; Bjørn and Finstad 2002), Scotland (Butler 2002), and Ireland (Tully et al. 1999), there is a concern that sea lice will be transmitted from salmon farms to wild stocks of Pacific salmon (*Oncorhynchus* spp.) and contribute to the decline of wild salmon stocks. This risk could be exacerbated with the anticipated expansion of the salmon aquaculture industry in British Columbia.

To evaluate the potential impacts of sea lice associated with salmon farms on wild stocks of salmon, it is necessary to determine the species composition and background levels of sea lice infection on salmon (Tingley et al. 1998; Mo and Heush 1998), as natural epizootics of sea lice have occurred on wild salmon prior to the establishment of salmon farms both in the Atlantic and Pacific Oceans (White 1940; Parker and Margolis 1968; Johnson et al. 1996). The prevalence and intensity of sea lice infection have been examined on Pacific salmon caught in the North Pacific (Nagasawa 1987), Sea of Japan (Nagasawa and Takami 1993), and Bering Sea (Nagasawa et al. 1993). However, these studies were generally performed on large salmon (30-70 cm) that had already spent over one year in the ocean. The extent of sea lice infection on juvenile salmon is poorly known, and has been studied only in the Broughton Archipelago (DFO 2001), an area with a large concentration of Atlantic salmon farms in British Columbia.

The objective of this data report is to present observations on the prevalence and intensity of sea lice (*Lepeophtheirus salmonis*) infection on juvenile pink salmon (*Oncorhynchus gorbuscha*) caught in the Eastern Bering Sea in September 2002. Salmon aquaculture (defined as netpen rearing) does not occur in Alaska or the Russian Far East, so levels of occurrence of sea lice in the Bering Sea can be considered representative of regions far removed from aquaculture operations.

This study was conducted while participating in a research initiative designed to examine the effects of ocean conditions on the early life history of salmon in the coastal areas of western Alaska in the eastern Bering Sea by the Ocean Carrying Capacity Program of the Alaska Fisheries Science Center, Auke Bay Laboratory (National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Juneau, Alaska, U.S.A.).

MATERIALS AND METHODS

Juvenile salmon were collected in the Eastern Bering Sea using a surface rope trawl (ca. 198 m long X 56 m wide X 12 m deep; mesh: 1.2 cm) aboard the fishing vessel (F/V) *Sea Storm* on September 10-24, 2002 (Table 1). Each net tow consisted of hauling the net at the surface (0-15 m) for 30 minutes at 5 knots. Except for stations 81 and 94, up to thirty juvenile pink salmon, coho salmon (*O. kisutsch*), and chinook salmon (*O. tshawytscha*), and up to fifty juvenile sockeye salmon (*O. nerka*) and chum salmon (*O. keta*) were randomly selected from each net tow. For these fish, fork length (±1 mm) and mass (±1 g) were determined on board the research vessel using a ruler and an electronic scale equipped with a counterweight to correct for ship motion. Fulton's condition factor (*K*) was also estimated as (Ricker 1975):

$$(1) \qquad K = 10^5 \cdot \frac{W}{FL^3}$$

where *W* is mass (g), and *FL* is fork length (mm).

The number of sea lice were counted only on juvenile pink salmon caught at latitude 60°N-62°N. Sea lice were rarely observed on other species of Pacific salmon (M. Trudel, *personal observation*), so we did not quantitatively assess their abundance during this survey. It is our intention to do so as opportunity arises in future. Thus, for this report, we present only the data collected on juvenile pink salmon. The skin of juvenile pink salmon was examined for the presence of sea lice (chalimus to adult stages). We did not examine the gills of juvenile pink salmon for the presence of sea lice copepodids.

Although the species of sea lice observed on the juvenile pink salmon were not identified in the field, they were probably *Lepeophtheirus salmonis* (Z. Kabata, Pacific Biological Station, Nanaimo, British Columbia, *personal communication*), as this species has also been previously observed on salmon in the Bering Sea (Nagasawa et al. 1993). Subsequent microscopic examination in the laboratory on a subsample of the sea lice brought back from the field verified this identification (B. Wing, *personal observation*).

We used the same terms defined by Margolis et al. (1982) to describe the levels of parasitic infection: prevalence is the percentage of infected fish, mean intensity is the mean number of parasites per *infected* fish, and abundance is the mean number of parasites per fish.

RESULTS AND DISCUSSION

A total of 595 juvenile pink salmon were caught in the Eastern Bering Sea in September 2002. Over 400 of these fish were measured and weighed. Juvenile pink salmon length ranged from 136 to 262 mm, and averaged 214.5 mm (Table 2), while their mass ranged from 20 to 207 g, and averaged 100.2 g (Table 2). The condition factor ranged from 0.74 to 1.20 (Table 2).

We examined a total of 284 juvenile pink salmon for sea lice (Table 3). Approximately 25% of the juvenile pink salmon were infected with 1-6 sea lice (Table 3). The mean intensity was 1.5 sea lice per infected fish, while the abundance of sea lice averaged 0.36 per fish (Table 3). Mature sea lice females measured 13-14 mm (B. Wing, *Personal observation*).

The sea lice counts were probably underestimated in this study, as some sea lice may have been dislodged by the net when the fish were captured (Nagasawa 1985). In addition, most of the juvenile pink salmon did not have any scales when they were brought on board the ship (M. Trudel, *personal observation*), probably because the fish are constantly rubbing against the net during capture. This would remove any chalimus attached to the scales and most pre-adults and adults sea lice as Holst et al. (1993) showed that the prevalence of sea lice on Altantic salmon post-smolts was negatively correlated to scale loss. There is also a possibility of lateral transfer of sea lice between fish in the net or when the fish are processed on the ship (Dr. Z. Kabata, Pacific Biological Station, Nanaimo, British Columbia, *personal communication*). This could bias the distribution of sea lice counts on the fish. Despite these limitations, the data collected in this study provide an initial reference for comparing other studies that use the same fishing gear, and to establish background levels of sea lice infection on juvenile pink salmon in areas remote from any salmon farms. However, further studies will be required to examine the variability of sea lice infection on all the species of Pacific salmon, as sea lice infection can vary among hosts (Nagasawa 1987; Nagasawa et al. 1993). In particular, chinook and pink salmon tend to have the highest prevalence and intensity of sea lice in the North Pacific and Bering Sea (Nagasawa 1987; Nagasawa et al. 1993). In addition, seasonal and annual variation of sea lice infection should also be examined, to determine whether or not a given level of sea lice infection is unusually elevated (Tully et al. 1999; Bjørn et al. 2001). This would help in assessing the impacts of sea lice associated with salmon farms on wild salmon stocks.

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Table 1. Catches of juvenile pink salmon in the Bering Sea in September 2002. SST: Sea surface temperature; Depth: Depth at the station.

Date	Station	Latitude	Longitude	SST (°C)	Depth (m)	Number of pink salmon
10-Sep-02	63	54°30' N	166°00' W	8.3	475	6
10-Sep-02	64	55°00' N	166°00' W	8.9	135	3
10-Sep-02	65	55°30' N	166°00' W	8.9	122	0
11-Sep-02	66	56°00' N	166°00' W	9.8	112	0
11-Sep-02	67	56°30' N	166°00' W	10.2	86	0
13-Sep-02	68	59°15' N	166°00' W	11.1	24	0
13-Sep-02	69	59°00' N	166°00' W	10.7	27	0
13-Sep-02	70	58°45' N	166°00' W	9.7	31	0
13-Sep-02	71	58°30' N	166°00' W	9.4	44	0
13-Sep-02	72	58°15' N	166°00' W	8.7	44	0
14-Sep-02	73	58°00' N	166°00' W	8.5	53	0
14-Sep-02	74	57°30' N	166°00' W	9.2	64	0
14-Sep-02	75	57°00' N	166°00' W	8.4	71	0
15-Sep-02	76	57°45' N	167°00' W	8.3	64	0
15-Sep-02	77	58°00' N	167°00' W	7.9	62	1
15-Sep-02	78	58°15' N	167°00' W	8.3	53	2
15-Sep-02	79	58°30' N	167°00' W	8.6	46	0
16-Sep-02	80	58°45' N	167°00' W	8.8	40	0
16-Sep-02	81	59°00' N	167°00' W	10.3	35	1
16-Sep-02	82	59°15' N	167°00' W	10.5	29	1
16-Sep-02	83	59°30' N	167°00' W	10.5	27	0
17-Sep-02	84	60°00' N	168°00' W	10.1	24	0
17-Sep-02	85	59°45' N	168°00' W	9.6	31	4
17-Sep-02	86	59°30' N	168°00' W	8.9	35	2
17-Sep-02	87	59°15' N	168°00' W	9.1	38	4
17-Sep-02	88	59°00' N	168°00' W	8.9	38	3
18-Sep-02	89	58°45' N	168°00' W	8.2	49	0
18-Sep-02	90	58°30' N	168°00' W	8.1	51	0
18-Sep-02	91	58°15' N	168°00' W	8.2	60	4
18-Sep-02	92	58°00' N	168°00' W	9.1	89	4
19-Sep-02	93	60°00' N	170°30' W	8.8	60	2
19-Sep-02	94	60°00' N	170°00' W	7.8	53	44
19-Sep-02	95	60°00' N	169°30' W	7.6	46	12
19-Sep-02	96	60°00' N	169°00' W	8.3	40	28
19-Sep-02	97	60°00' N	168°30' W	9.3	37	6
20-Sep-02	98	61°00' N	167°00' W	8.7	18	0
20-Sep-02	99	61°00' N	167°30' W	8.4	22	4
20-Sep-02	100	61°00' N	168°00' W	8.4	26	9
20-Sep-02	101	61°00' N	168°30' W	9.3	31	34
20-Sep-02	102	61°00' N	169°00' W	8.3	35	35

Table 1 (continued)

Date	Station	Latitude	Longitude	SST (°C)	Depth (m)	Number of pink salmon
21-Sep-02	103	61°00' N	169°30' W	7.8	40	2
21-Sep-02	104	61°00' N	170°00' W	7.7	44	18
21-Sep-02	105	61°00' N	170°30' W	8.2	49	8
21-Sep-02	106	61°00' N	171°00' W	8.1	53	30
21-Sep-02	107	61°00' N	171°30' W	8.3	59	52
22-Sep-02	108	62°00' N	170°00' W	7.3	42	0
22-Sep-02	109	62°00' N	170°30' W	7.3	44	2
22-Sep-02	110	62°00' N	171°00' W	7.4	48	33
22-Sep-02	111	62°00' N	171°30' W	7.5	49	199
22-Sep-02	112	62°00' N	172°00' W	7.3	51	19
23-Sep-02	113	62°00' N	169°30' W	7.4	38	0
23-Sep-02	114	62°00' N	169°00' W	7.4	35	10
23-Sep-02	115	62°00' N	168°30' W	7.0	31	21
23-Sep-02	116	62°00' N	168°00' W	7.6	26	2
23-Sep-02	117	62°00' N	167°30' W	7.9	24	0
24-Sep-02	118	62°00' N	167°00' W	7.7	26	0

Table 2. Fork length (mm), mass (g), Fulton's condition factor (mass/fork length^3), and number of sea lice on juvenile pink salmon caught in the Bering Sea in September 2002. NE: not examined.

Station	Fish number	Fork length	Mass	Condition factor	Number of sea lice
63	902	152	34	0.97	NE
63	903	170	42	0.85	NE
63	904	149	25	0.76	NE
63	905	148	30	0.93	NE
63	906	144	24	0.80	NE
63	907	159	36	0.90	NE
63	908	140	22	0.80	NE
63	909	136	20	0.80	NE
63	910	136	20	0.80	NE
64	911	176	46	0.84	NE
64	912	163	35	0.81	NE
64	913	167	38	0.82	NE
77	914	224	117	1.04	NE
78	915	192	63	0.89	NE
78	916	207	86	0.97	NE
79	917	215	88	0.89	NE
79	918	224	106	0.94	NE
79	919	216	92	0.91	NE
81	920	214	101	1.03	NE
82	921	229	118	0.98	NE
85	922	217	93	0.91	NE
85	923	207	83	0.94	NE
85	924	212	79	0.83	NE
85	925	177	47	0.85	NE
86	926	175	44	0.82	NE
86	927	220	86	0.81	NE
87	928	198	72	0.93	NE
87	929	226	109	0.94	NE
87	930	215	94	0.95	NE
87	931	236	147	1.12	NE
88	932	205	91	1.06	NE
88	933	200	77	0.96	NE
88	934	196	74	0.98	NE
91	935	214	106	1.08	NE
91	936	203	81	0.97	NE
91	937	212	86	0.90	NE
91	938	218	103	0.99	NE
92	939	223	89	0.80	NE

Table 2 (continued)

Station	Fish number	Fork length	Mass	Condition factor	Number of sea lice
92	940	219	106	1.01	NE
92	941	210	94	1.02	NE
93	942	214	98	1.00	NE
93	943	199	74	0.94	NE
94	944	217	98	0.96	0
94	945	228	116	0.98	0
94	946	207	89	1.00	0
94	947	230	119	0.98	0
94	948	221	105	0.97	1
94	949	199	88	1.12	1
94	950	220	91	0.85	0
94	951	247	151	1.00	1
94	952	217	107	1.05	0
94	953	198	72	0.93	0
94	954	237	130	0.98	2
94	955	242	147	1.04	1
94	956	211	94	1.00	0
94	957	222	107	0.98	0
94	958	213	99	1.02	0
94	959	238	130	0.96	0
94	960	212	92	0.97	0
94	961	221	106	0.98	0
94	962	195	67	0.90	0
94	963	214	98	1.00	0
94	964	210	87	0.94	1
94	965	187	61	0.93	0
94	966	202	83	1.01	0
94	967	206	81	0.93	0
94	968	208	83	0.92	0
94	969	234	126	0.98	0
94	970	218	105	1.01	0
94	971	224	113	1.01	1
94	972	229	114	0.95	0
94	973	212	87	0.91	0
94	974	216	120	1.19	0
94	975	223	108	0.97	0
94	976	207	82	0.92	0
94	977	215	95	0.96	0
94	978	220	98	0.92	0
94	979	227	112	0.96	1
94	980	218	102	0.98	0
94	981	212	92	0.97	0

Table 2 (continued)

Station	Fish number	Fork length	Mass	Condition factor	Number of sea lice
94	982	228	114	0.96	1
94	983	216	95	0.94	0
94	984	215	104	1.05	0
94	985	241	147	1.05	0
94	986	212	92	0.97	0
94	987	221	110	1.02	0
95	988	225	122	1.07	NE
95	989	220	118	1.11	NE
95	990	236	133	1.01	NE
95	991	228	116	0.98	NE
95	992	233	133	1.05	NE
95	993	212	100	1.05	NE
95	994	222	109	1.00	NE
95	995	220	118	1.11	NE
95	996	240	142	1.03	NE
95	997	196	75	1.00	NE
95	998	227	126	1.08	NE
95	999	200	80	1.00	NE
96	1000	216	100	0.99	NE
96	1001	221	105	0.97	NE
96	1002	216	87	0.86	NE
96	1003	217	110	1.08	NE
96	1004	231	125	1.01	NE
96	1006	235	127	0.98	NE
96	1007	225	111	0.97	NE
96	1008	232	128	1.03	NE
96	1009	226	114	0.99	NE
96	1010	220	109	1.02	NE
96	1011	213	96	0.99	NE
96	1012	211	89	0.95	NE
96	1013	205	85	0.99	NE
96	1014	221	112	1.04	NE
96	1015	202	83	1.01	NE
96	1016	231	117	0.95	NE
96	1017	220	99	0.93	NE
96	1019	224	111	0.99	NE
96	1020	226	111	0.96	NE
96	1021	202	86	1.04	NE
96	1022	227	118	1.01	NE
96	1023	208	88	0.98	NE
96	1024	231	131	1.06	NE
96	1025	210	97	1.05	NE

Table 2 (continued)

Station	Fish number	Fork length	Mass	Condition factor	Number of sea lice
96	1026	199	76	0.96	NE
96	1027	205	95	1.10	NE
96	1028	226	122	1.06	NE
96	1029	217	102	1.00	NE
97	1030	226	118	1.02	NE
97	1031	215	103	1.04	NE
97	1032	217	104	1.02	NE
97	1033	205	89	1.03	NE
97	1034	233	132	1.04	NE
97	1035	239	133	0.97	NE
99	1036	236	132	1.00	NE
99	1037	233	123	0.97	NE
99	1038	228	116	0.98	NE
99	1039	219	97	0.92	NE
100	1040	220	103	0.97	4
100	1041	213	100	1.03	0
100	1042	240	148	1.07	0
100	1043	236	131	1.00	0
100	1044	224	115	1.02	0
100	1045	206	82	0.94	0
100	1046	230	115	0.95	0
100	1047	229	121	1.01	0
100	1048	190	64	0.93	0
101	1049	234	133	1.04	NE
101	1050	220	102	0.96	NE
101	1051	220	108	1.01	NE
101	1052	227	122	1.04	NE
101	1053	250	184	1.18	NE
101	1054	188	70	1.05	NE
101	1055	210	94	1.02	NE
101	1056	200	78	0.98	NE
101	1057	230	123	1.01	NE
101	1058	235	122	0.94	NE
101	1059	203	82	0.98	NE
101	1060	234	118	0.92	NE
101	1061	212	85	0.89	NE
101	1062	228	119	1.00	NE
101	1063	200	73	0.91	NE
101	1064	202	78	0.95	NE
101	1065	215	90	0.91	NE
101	1066	215	99	1.00	NE
101	1067	218	95	0.92	NE

Table 2 (continued)

Station	Fish number	Fork length	Mass	Condition factor	Number of sea lice
101	1068	239	129	0.94	NE
101	1069	203	80	0.96	NE
101	1070	234	126	0.98	NE
101	1071	203	88	1.05	NE
101	1072	217	103	1.01	NE
101	1073	187	76	1.16	NE
101	1074	203	81	0.97	NE
101	1075	210	92	0.99	NE
101	1076	192	77	1.09	NE
101	1077	226	115	1.00	NE
101	1078	243	134	0.93	NE
101	1079	209	90	0.99	NE
102	1080	226	114	0.99	0
102	1081	218	106	1.02	0
102	1082	234	127	0.99	1
102	1083	241	136	0.97	0
102	1084	229	122	1.02	1
102	1085	229	119	0.99	0
102	1086	232	120	0.96	0
102	1087	220	102	0.96	0
102	1088	227	110	0.94	0
102	1089	230	125	1.03	1
102	1090	233	129	1.02	0
102	1091	230	128	1.05	1
102	1092	230	118	0.97	1
102	1093	210	87	0.94	0
102	1094	209	86	0.94	0
102	1095	215	107	1.08	0
102	1096	224	112	1.00	1
102	1097	230	125	1.03	2
102	1098	220	109	1.02	0
102	1099	220	118	1.11	1
102	1100	241	138	0.99	0
102	1101	217	108	1.06	0
102	1102	211	98	1.04	0
102	1103	226	115	1.00	0
102	1104	237	135	1.01	0
102	1105	223	110	0.99	0
102	1106	225	112	0.98	0
102	1107	209	84	0.92	0
102	1108	229	116	0.97	0
102	1109	238	126	0.93	1

Table 2 (continued)

Station	Fish number	Fork length	Mass	Condition factor	Number of sea lice
103	1110	235	127	0.98	NE
103	1111	202	76	0.92	NE
104	1112	210	89	0.96	1
104	1113	205	82	0.95	0
104	1114	223	106	0.96	0
104	1115	208	87	0.97	1
104	1116	223	103	0.93	4
104	1117	206	84	0.96	1
104	1118	207	75	0.85	0
104	1119	193	67	0.93	0
104	1120	199	72	0.91	0
104	1121	210	89	0.96	0
104	1122	225	103	0.90	0
104	1123	195	67	0.90	1
104	1124	198	70	0.90	0
104	1125	200	71	0.89	0
104	1126	205	75	0.87	0
104	1127	212	94	0.99	0
104	1128	214	88	0.90	0
104	1129	212	78	0.82	0
105	1130	233	121	0.96	0
105	1131	234	135	1.05	0
105	1132	200	78	0.98	0
105	1133	199	77	0.98	0
105	1134	200	77	0.96	0
105	1135	199	72	0.91	0
105	1136	192	69	0.97	1
105	1137	204	74	0.87	1
106	1138	201	69	0.85	2
106	1139	204	75	0.88	0
106	1140	205	82	0.95	5
106	1141	237	130	0.98	0
106	1142	195	77	1.04	0
106	1143	159	37	0.92	0
106	1144	232	124	0.99	0
106	1145	226	114	0.99	2
106	1146	206	87	1.00	0
106	1147	224	107	0.95	0
106	1148	199	78	0.99	0
106	1149	217	106	1.04	0
106	1150	225	105	0.92	0
106	1151	225	113	0.99	0

Table 2 (continued)

Station	Fish number	Fork length	Mass	Condition factor	Number of sea lice
106	1152	249	160	1.04	0
106	1153	215	84	0.85	1
106	1154	238	126	0.93	0
106	1155	238	118	0.88	0
106	1156	239	133	0.97	0
106	1157	226	107	0.93	0
106	1158	202	77	0.93	1
106	1159	215	97	0.98	0
106	1160	235	121	0.93	0
106	1161	195	65	0.88	0
106	1162	204	78	0.92	0
106	1163	202	79	0.96	0
106	1164	235	122	0.94	0
106	1165	196	57	0.76	0
106	1166	227	112	0.96	0
106	1167	231	108	0.88	0
107	1168	222	102	0.93	0
107	1169	228	112	0.94	6
107	1170	200	80	1.00	2
107	1171	202	79	0.96	0
107	1172	229	113	0.94	0
107	1173	231	128	1.04	2
107	1174	235	143	1.10	2
107	1175	189	64	0.95	0
107	1176	209	93	1.02	1
107	1177	223	118	1.06	0
107	1178	219	108	1.03	0
107	1179	222	123	1.12	1
107	1180	230	132	1.08	0
107	1181	240	145	1.05	0
107	1182	218	108	1.04	0
107	1183	187	69	1.06	0
107	1184	193	80	1.11	0
107	1185	200	77	0.96	0
107	1186	196	78	1.04	0
107	1187	200	84	1.05	0
107	1188	219	106	1.01	0
107	1189	219	115	1.09	1
107	1190	204	79	0.93	0
107	1191	194	70	0.96	0
107	1192	212	94	0.99	2
107	1193	192	73	1.03	0

Table 2 (continued)

Station	Fish number	Fork length	Mass	Condition factor	Number of sea lice
107	1194	225	121	1.06	1
107	1195	217	104	1.02	0
107	1196	210	103	1.11	1
107	1197	203	85	1.02	0
109	1198	240	147	1.06	0
109	1199	183	60	0.98	0
110	1200	216	108	1.07	3
110	1201	214	102	1.04	1
110	1202	233	131	1.04	0
110	1203	262	207	1.15	0
110	1204	218	115	1.11	2
110	1205	209	83	0.91	0
110	1206	214	102	1.04	0
110	1207	234	136	1.06	0
110	1208	228	128	1.08	0
110	1209	234	132	1.03	0
110	1210	191	67	0.96	0
110	1211	246	163	1.09	1
110	1212	224	111	0.99	0
110	1213	215	99	1.00	0
110	1214	214	113	1.15	1
110	1215	221	120	1.11	0
110	1216	200	84	1.05	1
110	1217	187	66	1.01	0
110	1218	220	105	0.99	0
110	1219	220	105	0.99	0
110	1220	227	114	0.97	1
110	1221	220	124	1.16	0
110	1222	224	115	1.02	0
110	1223	220	123	1.16	0
110	1224	223	128	1.15	3
110	1225	224	123	1.09	0
110	1226	217	112	1.10	0
110	1227	215	102	1.03	0
110	1228	220	108	1.01	1
110	1229	224	127	1.13	0
110	1230	214	108	1.10	0
111	1231	215	105	1.06	2
111	1232	164	40	0.91	1
111	1233	217	101	0.99	0
111	1234	222	119	1.09	0
111	1235	241	152	1.09	0

Table 2 (continued)

Station	Fish number	Fork length	Mass	Condition factor	Number of sea lice
111	1236	219	109	1.04	0
111	1237	235	135	1.04	0
111	1238	228	126	1.06	0
111	1239	216	85	0.84	0
111	1240	194	75	1.03	0
111	1241	217	96	0.94	0
111	1242	211	96	1.02	2
111	1243	216	102	1.01	0
111	1244	213	101	1.05	1
111	1245	238	145	1.08	0
111	1246	220	112	1.05	0
111	1247	216	100	0.99	0
111	1248	224	122	1.09	0
111	1249	212	98	1.03	0
111	1250	225	120	1.05	0
111	1251	228	123	1.04	2
111	1252	229	133	1.11	0
111	1253	217	108	1.06	0
111	1254	229	133	1.11	0
111	1255	221	122	1.13	0
111	1256	232	136	1.09	0
111	1257	222	131	1.20	0
111	1258	228	122	1.03	0
111	1259	206	89	1.02	0
111	1260	215	105	1.06	2
112	1261	232	137	1.10	1
112	1262	222	116	1.06	2
112	1263	222	119	1.09	1
112	1264	212	102	1.07	0
112	1265	219	105	1.00	0
112	1266	230	127	1.04	0
112	1267	219	78	0.74	0
112	1268	210	99	1.07	1
112	1269	221	117	1.08	0
112	1270	231	130	1.05	0
112	1271	215	102	1.03	0
112	1272	217	106	1.04	0
112	1273	219	104	0.99	0
112	1274	214	94	0.96	1
112	1275	213	103	1.07	0
112	1276	218	117	1.13	1
112	1277	202	87	1.06	0

Table 2 (continued)

Station	Fish number	Fork length	Mass	Condition factor	Number of sea lice
112	1278	228	124	1.05	0
112	1279	218	94	0.91	3
114	1280	208	91	1.01	0
114	1281	208	92	1.02	0
114	1282	220	98	0.92	0
114	1283	207	86	0.97	0
114	1284	187	63	0.96	1
114	1285	192	70	0.99	0
114	1286	234	130	1.01	0
114	1287	208	89	0.99	0
114	1288	213	92	0.95	1
114	1289	189	63	0.93	0
115	1290	195	70	0.94	0
115	1291	217	99	0.97	0
115	1292	232	117	0.94	0
115	1293	201	84	1.03	0
115	1294	231	121	0.98	0
115	1295	201	81	1.00	0
115	1296	194	70	0.96	0
115	1297	217	98	0.96	1
115	1298	211	90	0.96	0
115	1299	202	76	0.92	0
115	1300	204	91	1.07	0
115	1301	203	72	0.86	0
115	1302	212	94	0.99	1
115	1303	226	114	0.99	0
115	1304	217	106	1.04	0
115	1305	204	78	0.92	0
115	1306	205	84	0.98	0
115	1307	188	61	0.92	0
115	1308	209	90	0.99	0
115	1309	235	142	1.09	0
115	1310	197	72	0.94	0
116	1311	206	85	0.97	0
116	1312	179	54	0.94	0

Table 3. Frequency distribution of sea lice on juvenile pink salmon caught in the Eastern Bering Sea in September 2002.

Number of sea lice per fish	Eastern Bering Sea
0	217
1	46
2	14
3	3
4	2
5	1
6	1
≥7	0